

Hybrid Production and Assembly

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Si 2b electronics
9/9/02

Site visits to

- Assembly vendors:
 - **COB Solutions** (San Jose)
 - **Promex** (Santa Clara)
 - **MeltroniX** (San Diego)
- Production Vendor
 - **CPT** (Oceanside)

First Results:

- Cost overview
- Wire bonding
- SMT
- Problems with Amitron L2A

Quote Comparison

Meltronix				
	10	\$105		1,050.00
	440	\$70		30,100.00
	Non Recurring Engineering (NRE)		\$2,100.00	
	Non Recurring Tooling (NRT)		\$700.00	
	Run Charge		\$500.00	
NRE total			\$3,300.00	3,300.00
Meltronix total				34,450.00
Promex				
	5 Units -	\$65.62		1,312.40
	10 units -	\$52.67		
	20 units -	\$46.47		
	30 units -	\$40.00		3,200.00
	40 units -	\$38.96		
	50 units -	\$38.34		13,035.60
	Solder Stencil (1) -		\$400.00	
	P&P Programming -		\$360.00	
	SMT Plate (1)-		\$420.00	
	Wire bond work holder (1) -		\$500.00	
	Documentation -		\$250.00	
NRE total			\$1,930.00	1,930.00
Promex total				19,478.00
COB Industries				
	400 units -	\$29.90		13,156.00
	Bonding and SMC fixtures(tooling):		\$200.00	
	Solder paste st		\$250.00	
NRE total			\$450.00	450.00
COB Ind. Total				13,606.00

Assembly Vendors

COB Solution Inc.

- Very small company in San Jose
 - **Owner + 2 technicians**
- K&S 1448 automatic wire bonder (Au or Al)
- Hire out for large scale SMT
- Currently handle 100 pieces/week for electronic Michelin tire gauge.
 - **Double sided SMT with approx 80bonds.**
 - **Workmanship looks good.**
- Given one Amitron L2A hybrid to assemble
 - **Encountered soldering problem!**

Promex

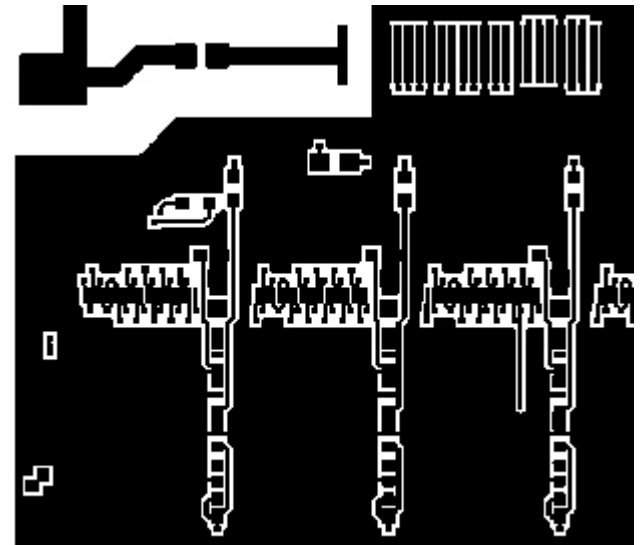
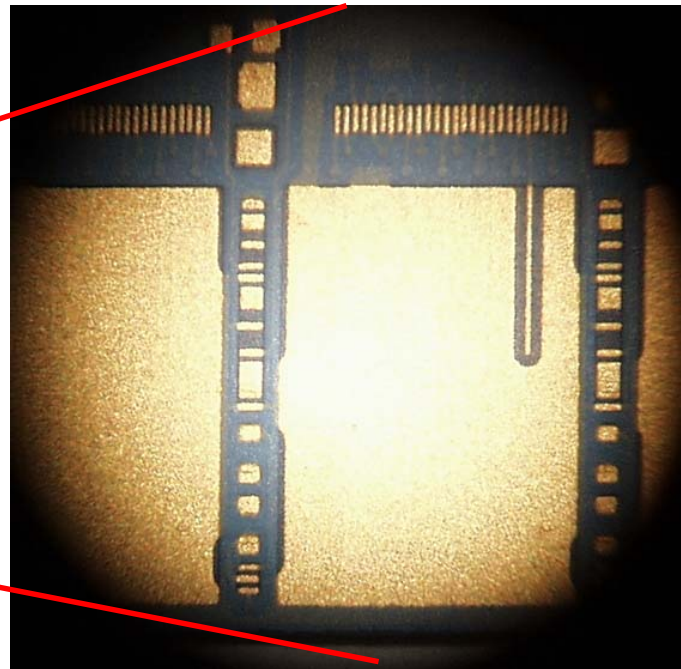
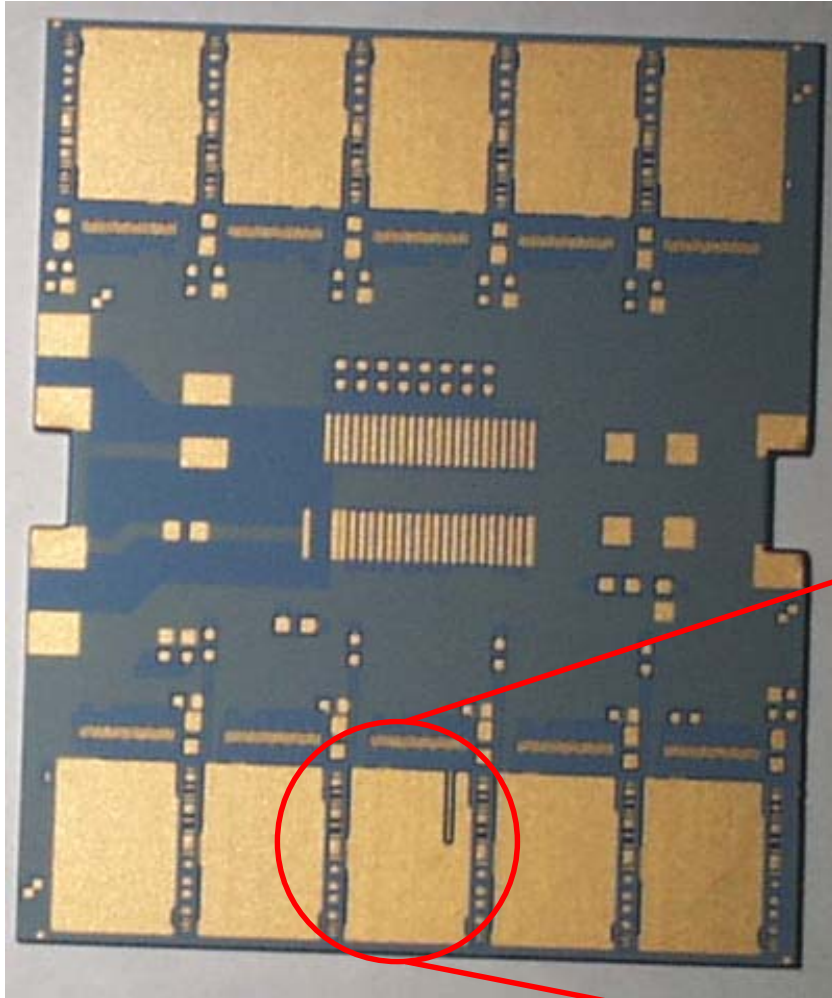
- Extensive addition of new equipment since run 2a project
- Given one mechanical Amitron L2A Hybrid for bonding tests.

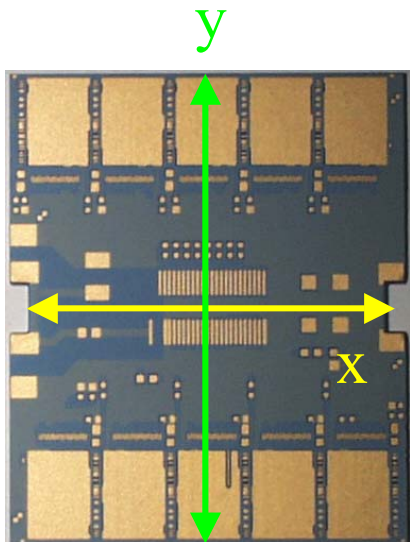
Assembly Vendors

MeltroniX

- Site visit most organized
- Met with all engineers and VP
- Two week turn around on 100 pieces
- Run card to our specs
 - **Thermal epoxy for SVX- what about dielectric layers?**
 - **Gold bonding- why not?**
 - Rework? Scattering?
- Given 5 Amitron L2A hybrids
 - **21 svx2 - stuff 2 complete**
 - **Stuff 2 to SMT**
 - **1 mechanical**
- Solder problems
 - **Use epoxy on best effort basis**
 - **Challenging to wire bond -- expect two today**

L2 Axial Hybrid 3823-112-EB-330380
Amitron, delivered 8/1/02





Amitron L2A

Thickness:

0.66 ± 0.03 mm

0.026 ± 0.001 in

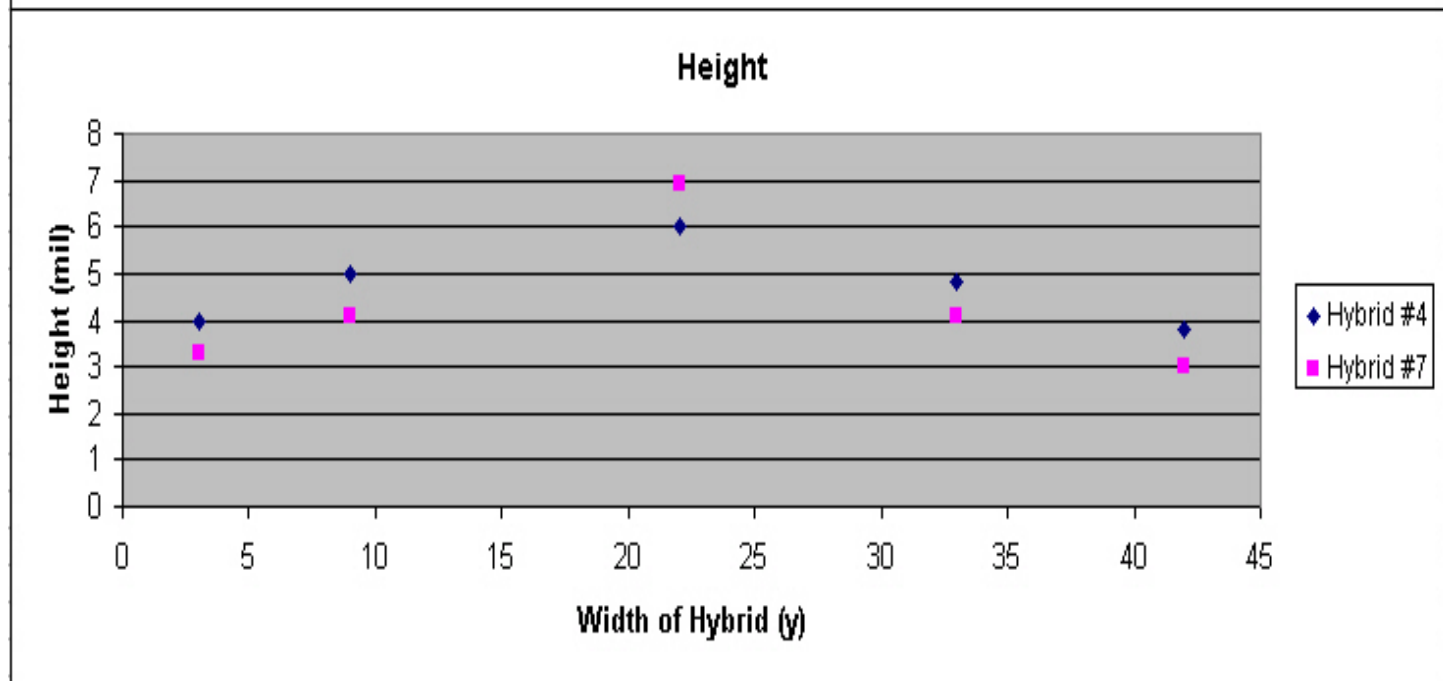
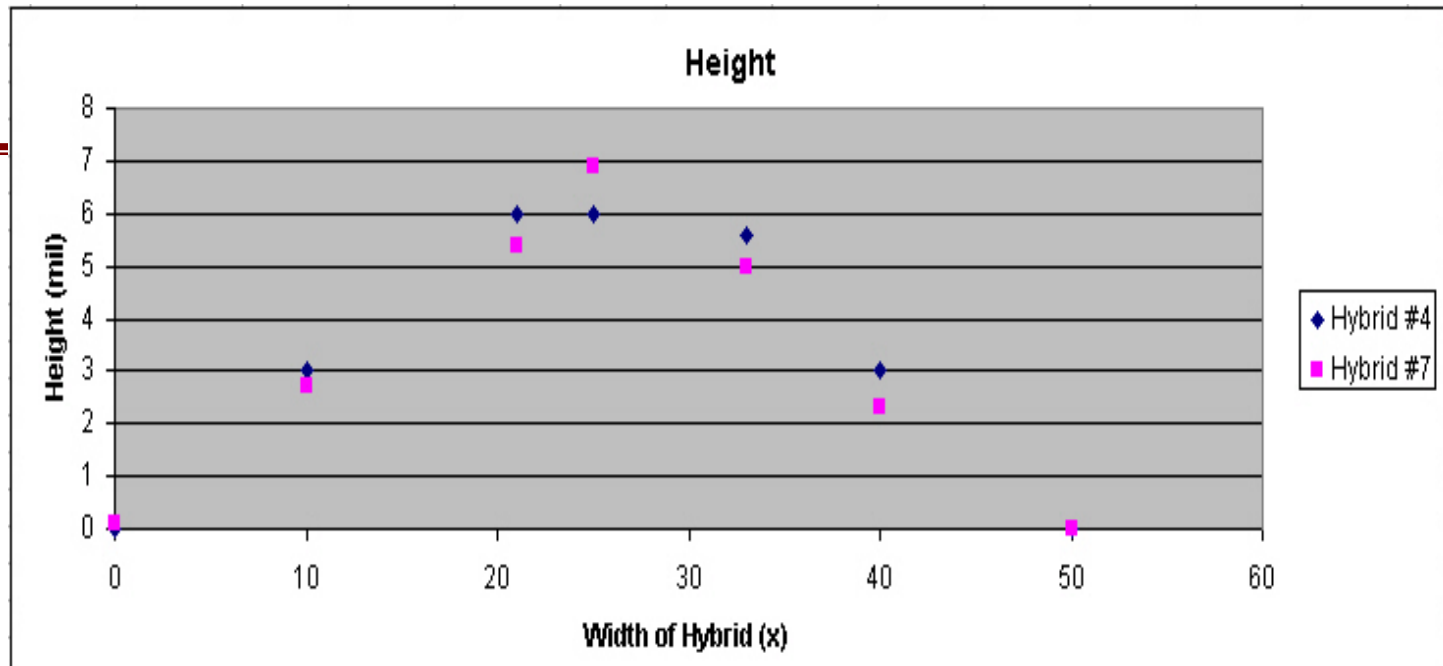
compare:

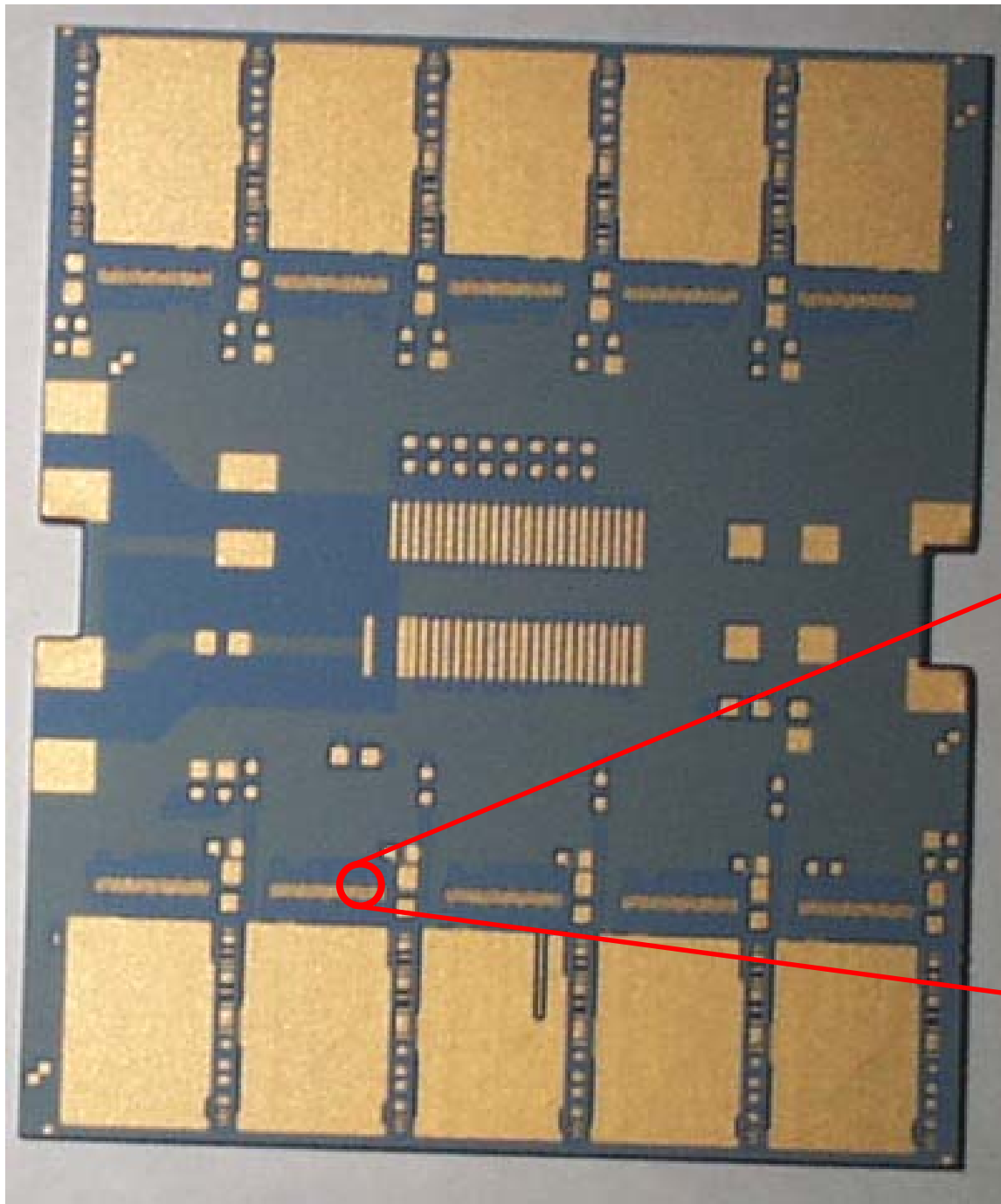
CPT L1

Thickness:

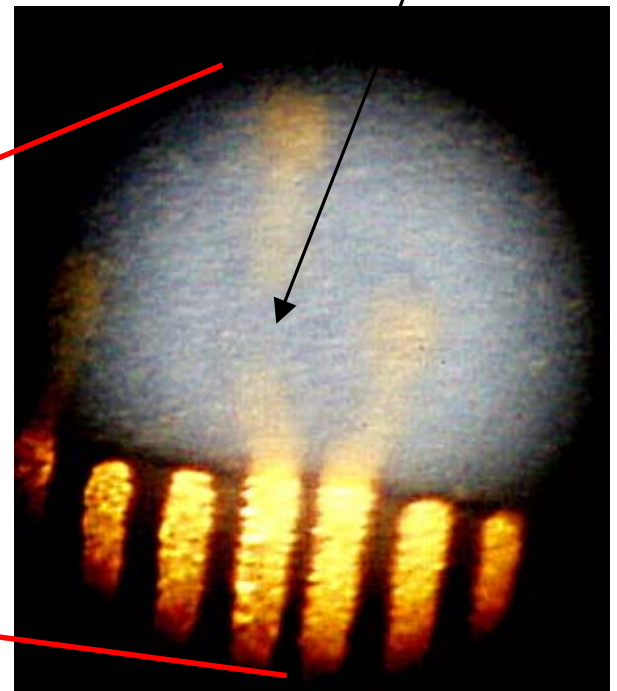
0.89 ± 0.03 mm

0.035 ± 0.001 in

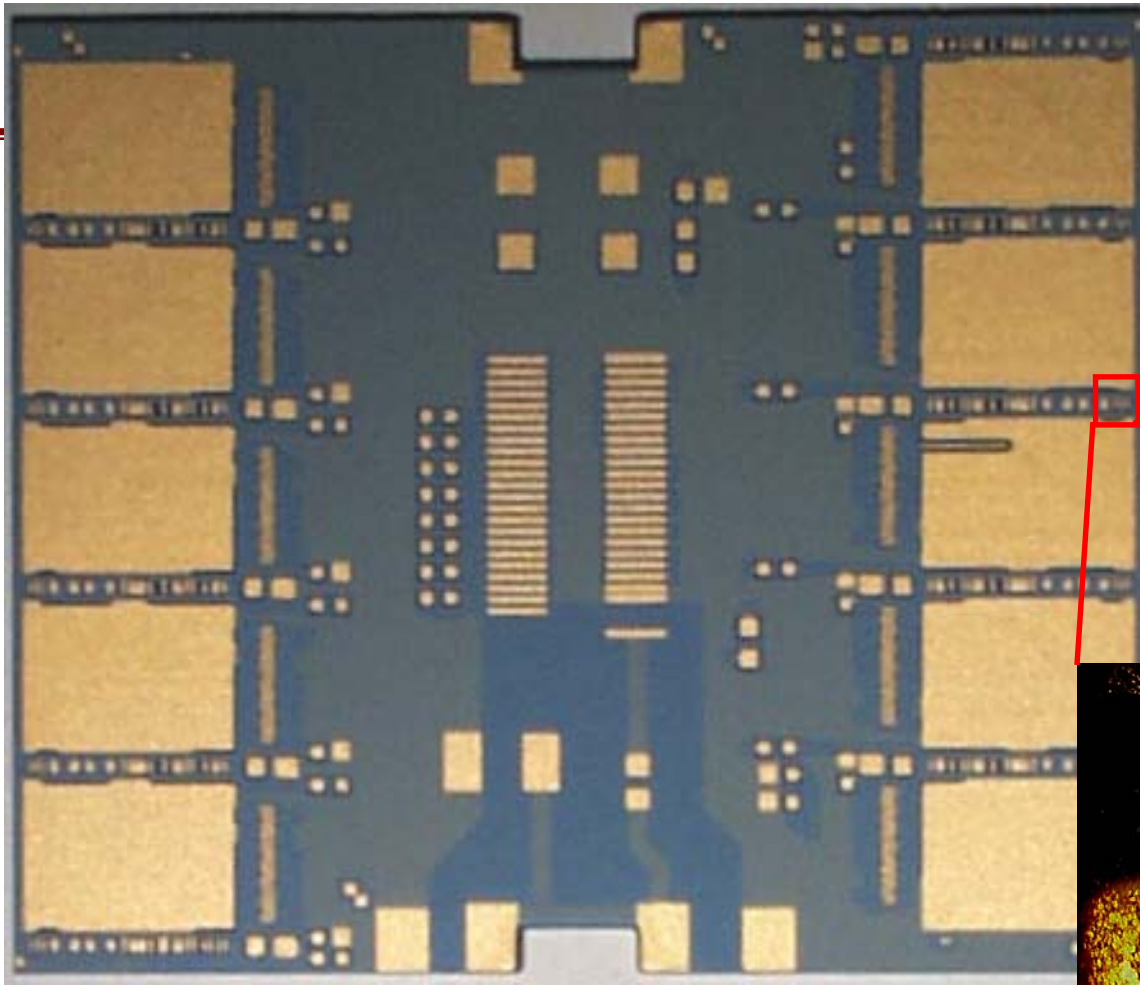




Apparent break
just visible under
top layers



Open, d6 (15.38, 11.34)



Bond pull strength:

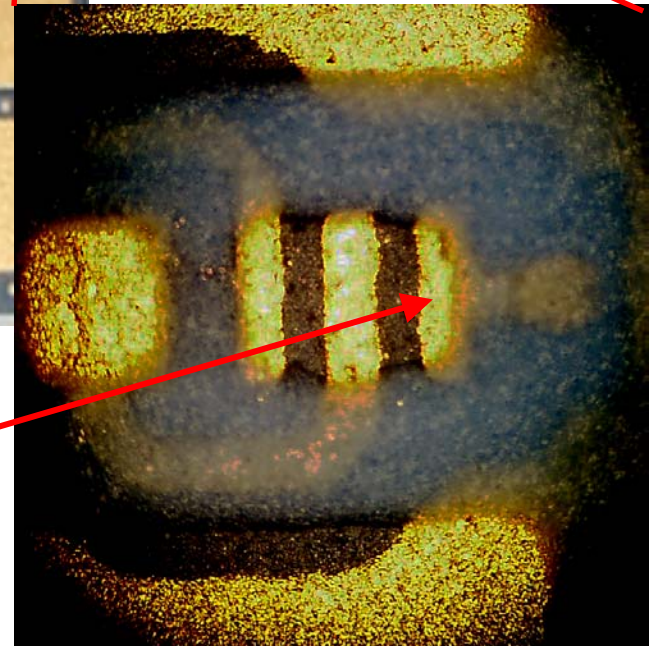
MeltroniX:

6.3 to 7.1g $<6.7> \pm 0.8g$

Promex:

6.5 to 7.9g $<7.3> \pm 0.5g$

Pads too small for reliable
wedge bonding



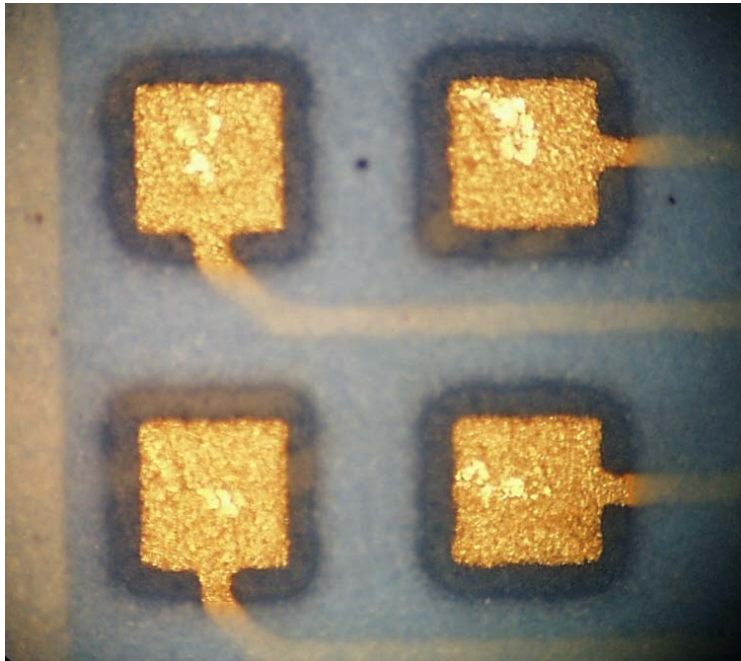
Gold solder pads- wrong plating alloy? (pure Au?)

Solder paste used: COB Solutions *and* MeltroniX

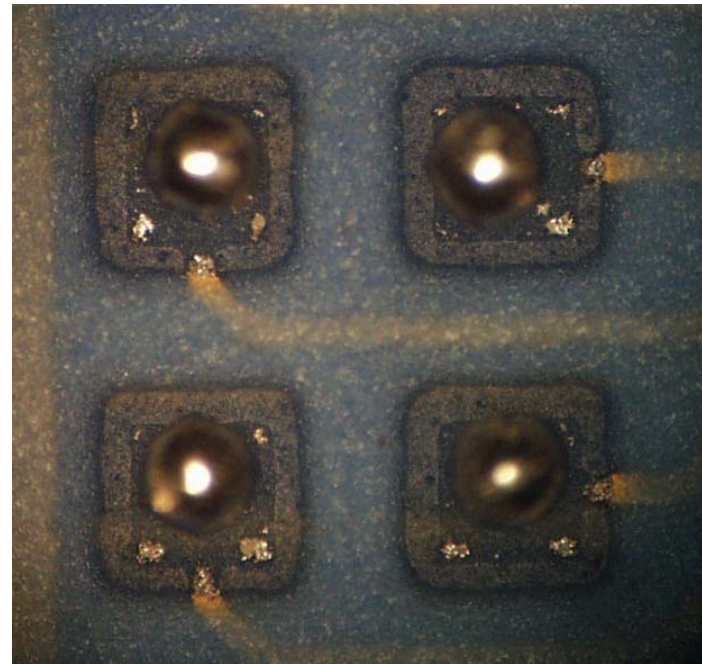
Sn62/Pb36/Ag2 reflow 205-220 °C (20s)

heat alone — no ill effect

before



after



Production Vendor

CPT

Bad news

- 3 week delay due to delay on substrate

Good news

- Dual flying head probe continuity test (new machine)
- Laser scanning ability

Flatness- in specs?

- More dielectric layers on bottom